What is claimed is:

1. A device for photodynamic stimulation of human cells, comprising:

a base housing containing a control mechanism and a pulse generator; and

at least one applicator equipped with at least one pulsed first light source connected to said pulse generator;

wherein:

the generator is configured to selectably supply electrical pulses at a frequency between 200 and 20,000 Hz., a pulse length between 2 and 200 microseconds, and an amplitude of between 2 and 25 volts; and

the at least one first light source is a semiconductor diode which emits light of approximately 600, 900, and 1200 nanometers wavelength in response to said pulses from said generator.

2. A device according to claim 1, wherein at least one of the first light sources is a semiconductor diode which emits blue-light radiation in the range of 350 to 500 nanometers.

3. A device according to claim 1, wherein at least one of the first light sources is a tube which emits blue-light radiation in the range of 350 to 500 nanometers.

4. A device according to claim 1, wherein the at least one applicator comprises sensors connected to the control mechanism for measurement of reflected light for feedback control and automatic adjustment.

5. A device according to claim 1, wherein the at least one applicator is mounted to the base housing by means of a movable-joint arm.

6. A device according to claim 5, wherein the at least one applicator comprises several single applicators hinged together so as to be adjustable at angles with respect to one another.

7. A device according to claim 1, further comprising a hand-held applicator comprising at least one second light source connected to said pulse generator and at least one light outlet.

8. A device according claim 7 wherein the hand-held applicator is equipped with a shaft and a head and a printed circuit board equipped with semiconductor diodes.

9. A device according to claim 7 wherein the at least one light outlet is equipped with a mounted lens.

10. A device according to claim 8 wherein:

at least a first semiconductor diode on the printed circuit board radiates red and infrared light at wavelengths of approximately 600, 900, and 1200 nanometers;

at least a second semiconductor diode on the printed circuit board radiates blue light in the range of approximately 350 to 500 nanometers;

the head comprises an expander rotatable to selectably conduct blue light or red and infrared light to said at least one light outlet.

11. A device according to claim 10, wherein the expander includes a fiber optic cable.

12 A device according to claim 10, wherein the light output is at approximately 25% of a selected level for approximately 10 seconds and is at the selected level thereafter.

13. A method of treating tissue, comprising the steps of:

introducing a photosensitive substance to the tissue;

determining when the tissue has absorbed a predetermined level of the photosensitive substance; and

irradiating the tissue with a device according to claim 1.

14. A method according to claim 13, wherein the step of introducing a photosensitive substance to the tissue comprises topical application of a lotion containing the photosensitive substance.

15. A method according to claim 13, wherein the step of introducing a photosensitive substance to the tissue comprises oral ingestion of a substance comprising at least the photosensitive substance.

16. A method according to claim 13, wherein the step of introducing a photosensitive substance to the tissue comprises subcutaneous injection of a substance comprising at least the photosensitive substance.

17. A method according to claim 13, wherein the photosensitive substance is one of photofrin, 5-aminolevulan acid, hermatoporphyrin, verteporfin, chlorins, phthaldodyanines, phenothiazine, benzoporphyrin-derivative monoacid-A (ATMPn), L-Phenylalanin, and ammi visnaga.

18. A method according to claim 13, wherein dimethylsulfoxide is also introduced to the tissue.

19. A method according to claim 13, wherein dimethylsulfoxide is mixed with the photodynamic substance.

20. A method according to claim 13, wherein:

the photosensitive substance is photofrin;

the photosensitive substance is introduced to the tissue of a patient by subcutaneous injection of 1 to 2 mg. per kg. of the patient's weight;

the patient is kept in dim light for approximately 48 hours before irradiation; and

the patient is kept out of strong light for approximately eight weeks after irradiation.

21. A method according to claim 13, wherein:

the photosensitive substance is 5-Aminolavulin acid;

the photosensitive substance is introduced to the tissue of a patient by topical application of a 10 to 20 percent mixture in one of an oil-in-water emulsion and a cream;

the patient is kept in dim light for approximately six hours before irradiation; and

the patient is kept out of strong light for approximately 48 hours after irradiation.

22. A method according to claim 13, wherein:

the photosensitive substance is L-Phenylalanin;

the photosensitive substance is introduced to the tissue of a patient by topical application of a 5 to 30 percent mixture according to a degree of treatment desired; and

the patient is kept out of strong light for approximately 24 hours after application.

23. A method according to claim 13, wherein:

the photosensitive substance is L-Phenylalanin;

the photosensitive substance is introduced to the tissue of a patient by oral ingestion of 50 to 100 mg according to the patient's weight and to degree of treatment desired;

the patient is kept in dim light for approximately 60 minutes before irradiation; and

the patient is kept out of strong light for approximately 24 hours after application.

24. A method according to claim 13, wherein:

the photosensitive substance is ammi visnaga;

the photosensitive substance is administered to the tissue of a patient by topical application of a 5 to 30 percent mixture, according to degree of treatment desired, in a liquid medium;

the patient avoids direct sunlight for approximately 30 minutes before irradiation; and

the patient avoids sunbathing for approximately five days after irradiation.

25. A method according to claim 13, wherein:

the photosensitive substance is ammi visnaga;

the photosensitive substance is administered to the tissue of a patient by oral ingestion of approximately 100 mg. thereof;

the patient avoids direct sunlight for approximately three hours before irradiation; and

the patient avoids sunbathing for approximately five days after irradiation.

26. A method according to claim 13, wherein the step of determining when the tissue has absorbed a predetermined level of the photosensitive substance comprises observing that the tissue undergoes a predetermined color change when viewed under a predetermined illumination.

27. A method according to claim 26, wherein the predetermined illumination comprises a wood lamp.

28. An apparatus according to claim 1, wherein the pulse duration is limited to 20 microseconds.

29. A method according to claim 13, wherein the pulse duration is limited to 20 microseconds.

30. A device for photodynamic stimulation of human cells, comprising:

a base housing containing a control mechanism and a pulse generator; and

at least one applicator equipped with at least one pulsed first light source connected to said pulse generator;

wherein:

the generator is configured to selectably supply electrical pulses at a frequency between 200 and 20,000 Hz., a pulse length between 2 and 200 nanoseconds, and an amplitude of between 40 and 400 volts; and

the at least one first light source is a laser diode which emits light of approximately 600, 900, and 1200 nanometers wavelength in response to said pulses from said generator.

31. A device according to claim 30, wherein at least one of the first light sources is a laser diode which emits blue-light radiation in the range of 350 to 500 nanometers.

32. A device according to claim 30, wherein at least one of the first light sources is a tube which emits blue-light radiation in the range of 350 to 500 nanometers.

33. A device according to claim 30, wherein the at least one applicator comprises sensors connected to the control mechanism for measurement of reflected light for feedback control and automatic adjustment.

34. A device according to claim 30, wherein the at least one applicator is mounted to the base housing by means of a movable-joint arm.

35. A device according to claim 34, wherein the at least one applicator comprises several single applicators hinged together so as to be adjustable at angles with respect to one another.

36. A device according to claim 30, further comprising a hand-held applicator comprising at least one second light source connected to said pulse generator and at least one light outlet.

37. A device according claim 36 wherein the hand-held applicator is equipped with a shaft and a head and a printed circuit board equipped with laser diodes.

38. A device according to claim 36 wherein the at least one light outlet is equipped with a mounted lens.

39. A device according to claim 37 wherein:

at least a first laser diode on the printed circuit board radiates red and infrared light at wavelengths of approximately 600, 900, and 1200 nanometers;

at least a second laser diode on the printed circuit board radiates blue light in the range of approximately 350 to 500 nanometers;

the head comprises an expander rotatable to selectably conduct blue light or red and infrared light to said at least one light outlet.

40. A device according to claim 39, wherein the expander includes a fiber optic cable.

41 A device according to claim 39, wherein the light output is at approximately 25% of a selected level for approximately 10 seconds and is at the selected level thereafter.

42. A method of treating tissue, comprising the steps of:

introducing a photosensitive substance to the tissue;

determining when the tissue has absorbed a predetermined level of the photosensitive substance; and

irradiating the tissue with a device according to claim 30.

43. A method according to claim 42, wherein the step of introducing a photosensitive substance to the tissue comprises topical application of a lotion containing the photosensitive substance.

44. A method according to claim 42, wherein the step of introducing a photosensitive substance to the tissue comprises oral ingestion of a substance comprising at least the photosensitive substance.

45. A method according to claim 42, wherein the step of introducing a photosensitive substance to the tissue comprises subcutaneous injection of a substance comprising at least the photosensitive substance.

46. A method according to claim 42, wherein the photosensitive substance is one of photofrin, 5-aminolevulan acid, hermatoporphyrin, verteporfin, chlorins, phthaldodyanines, phenothiazine, benzoporphyrin-derivative monoacid-A (ATMPn), L-Phenylalanin, and ammi visnaga.

47. A method according to claim 42, wherein dimethylsulfoxide is also introduced to the tissue.

48. A method according to claim 42, wherein dimethylsulfoxide is mixed with the photodynamic substance.

49. A method according to claim 42, wherein:

the photosensitive substance is photofrin;

the photosensitive substance is introduced to the tissue of a patient by subcutaneous injection of 1 to 2 mg. per kg. of the patient's weight;

the patient is kept in dim light for approximately 48 hours before irradiation; and

the patient is kept out of strong light for approximately eight weeks after irradiation.

50. A method according to claim 42, wherein:

the photosensitive substance is 5-Aminolavulin acid;

the photosensitive substance is introduced to the tissue of a patient by topical application of a 10 to 20 percent mixture in one of an oil-in-water emulsion and a cream;

the patient is kept in dim light for approximately six hours before irradiation; and

the patient is kept out of strong light for approximately 48 hours after irradiation.

51. A method according to claim 42, wherein:

the photosensitive substance is L-Phenylalanin;

the photosensitive substance is introduced to the tissue of a patient by topical application of a 5 to 30 percent mixture according to a degree of treatment desired; and

the patient is kept out of strong light for approximately 24 hours after application.

52. A method according to claim 42, wherein:

the photosensitive substance is L-Phenylalanin;

the photosensitive substance is introduced to the tissue of a patient by oral ingestion of 50 to 100 mg according to the patient's weight and to degree of treatment desired;

the patient is kept in dim light for approximately 60 minutes before irradiation; and

the patient is kept out of strong light for approximately 24 hours after application.

53. A method according to claim 42, wherein:

the photosensitive substance is ammi visnaga;

the photosensitive substance is administered to the tissue of a patient by topical application of a 5 to 30 percent mixture, according to degree of treatment desired, in a liquid medium;

the patient avoids direct sunlight for approximately 30 minutes before irradiation; and

the patient avoids sunbathing for approximately five days after irradiation.

54. A method according to claim 42, wherein:

the photosensitive substance is ammi visnaga;

the photosensitive substance is administered to the tissue of a patient by oral ingestion of approximately 100 mg. thereof;

the patient avoids direct sunlight for approximately three hours before irradiation; and

the patient avoids sunbathing for approximately five days after irradiation.

55. A method according to claim 42, wherein the step of determining when the tissue has absorbed a predetermined level of the photosensitive substance comprises observing that the tissue undergoes a predetermined color change when viewed under a predetermined illumination.

56. A method according to claim 56, wherein the predetermined illumination comprises a wood lamp.

57. An apparatus according to claim 30, wherein the pulse duration is limited to 20 nanoseconds.

58. A method according to claim 42, wherein the pulse duration is limited to 20 nanoseconds.